SAC Cereal Recommended List for 2012

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INTRODUCTION

Recommendations are made by SAC and are based on data collected as part of the HGCA Recommended Lists' system. The full data collected and the HGCA Recommended Lists are available on the HGCA website (www.hgca.com): this includes information on varieties not mentioned on the SAC list. Some of the detailed agronomy advice is based on HGCA's RL Plus 'Varieties On Your Farm'; this interactive programme is available on the HGCA website.

To improve the regional application of cereal trials, the UK is divided into several regions. The yields of winter wheat, spring and winter barley, given in the **Tables** are based on trials in the arable east to the north of Durham. For minor crops the yields are UK yields; the spring wheat yields are from spring-sown trials.

A variety is not recommended until it has completed at least three years in trial. If the UK performance indicates a consistent economic benefit over the best existing comparable variety and there are no unacceptable weaknesses, the candidate is given a UK provisional recommendation, indicating its first (P1) or second (P2) year. Varieties that do not merit a UK recommendation but have a specific use are given S. New varieties may also be given a provisional specific use (PS). The SAC list also uses the category 'becoming outclassed' (O) to describe varieties that are either declining in use or have developed significant agronomic weaknesses. Varieties in the O category may still retain local interest from growers or end users. In the variety **Tables**, entries are listed in order of fungicide treated yield; this is expressed as a percentage of the average treated yield of the control varieties.

A variety may demonstrate advantages or disadvantages under commercial production and marketing that are not evident in field trials. In due course this additional information is included in the notes on varieties. The disease resistance scores indicate the current situation; experience has shown that resistance to barley mildew and wheat yellow rust may not be maintained.

Assessment of quality is provided by the Malting Barley Committee, the Scotch Whisky Association, the Scottish Flour Millers' Association, the Scottish Oat Millers and others assisting HGCA's RL Crop Committees.

Supplies of multiplication seed (Basic and Certified 1st Generation) may not be generally available; C2 seed stocks of the newer varieties may also be limited.

In case of doubt, or for information about varieties not listed, farmers should consult their SAC crop specialists or the HGCA website.

CHOICE OF VARIETY AND MARKET REQUIREMENTS

Before choosing a variety consider the following factors and decide which will influence your decision:

- Sale for brewing, distilling or milling (check with your buyer).
- Specific weight.
- Earliness or need to spread the harvest period.
- Ear loss and sprouting risks.
- Disease risk (see below).
- Straw strength and length (barley straw can be of considerable value).

Having eliminated the inappropriate varieties, select from the remainder those with the highest yield potential.

There is a large wheat market for grain whisky production in Scotland. There is a strong preference for soft grain of large grain size, low protein content, with good specific weight and low screenings. Ratings for distillery performance range from Good for Beluga, Istabraq, Viscount and Denman to Poor for all hard wheat varieties and those soft wheat varieties carrying the 1b/1r rye gene translocation. Hard wheat varieties and those giving a reduced alcohol yield or process limitation are discouraged by distillers.

Grain whisky production also uses high enzyme malted barley: sourced from Scotland. Decanter was the benchmark variety for some time, but it has been replaced by Belgravia, which is the only variety with full IBD Approval for this market.

For biscuit-making, soft wheats are preferred. The Hagberg falling number should exceed 100, protein should be above 10.7% (on a dry matter basis using the Dumas method) and the gluten must not be damaged by high temperature drying.

There is also demand for bread wheat but only if quality specifications are fully met. Because of our climate, Scottish wheat is generally lower in protein than its English counterpart. In wet harvests the Hagberg falling number is so severely reduced that grain is unlikely to meet bread-making requirements.

HGCA promotes two export brands to assist foreign millers and bakers in recognising the characteristics of UK varieties. ***uks*** covers soft extensible varieties that can be used for biscuit-making or blended into a bread-making flour. ***ukp*** covers semi-hard varieties that suit both EU and non-EU bread-making. The intervention market for wheat is restricted to common wheat (*Triticum aestivum*).

Some varieties of wheat are susceptible to poor seed set or ear sterility. Although the precise cause is unknown, evidence from SAC research implicates frosty conditions during ear development, or at flowering. The risk to vulnerable varieties increases in seasons when forward crops are exposed to late frosts. Early sowing, a fast speed of development and warm weather in early spring will contribute to forward growth.

In the malting market many current varieties have qualities acceptable for both brewing and distilling, whilst some will be used for distilling or brewing only. Barley quality requirements are becoming more precise, especially as characters affecting grain processing are taken into account. Some varieties are inclined to dormancy, this can prejudice their use by maltsters. Others are prone to splitting, skinning or pre-germination; these conditions may lead to rejection by maltsters. The IBD Approval system (formerly IoB Approval system) is based on malt use with Approval lists for brewing and distilling.

In 2010, the Scotch Whisky Association stated that it will only support potential candidate varieties that are non-producers of GN such as the established varieties Concerto and Belgravia, and the new varieties Shuffle, Moonshine, Odyssey, Chronicle and Overture. This stance is an important aspect of long-term product protection. Established low-producers of GN such as Optic will continue to be used by distillers, but potential candidates of this type will not be supported in future.

In the barley variety **Table**, new malting recommendations are listed according to their progress in the IBD Approval system. New varieties are indicated as under initial micro-malting tests (T). Stage 1 Provisional IBD Approval i.e. P(1) is based on satisfactory micro-malting or lab results. A variety is moved to Stage 2 Provisional IBD Approval i.e. P(2) if the initial commercial scale tests are satisfactory. Full IBD Approval (F) is based on a minimum number of satisfactory commercial scale tests.

There is some demand for winter malting barley, though in practice only a small proportion of the Scottish crop meets the grain nitrogen and other specifications, and is not generally used in the production of malt whisky. The Malting Barley Committee will grant IBD brewing Approval for winter barley grown in Scotland, Pearl and Cassata are the only currently Approved varieties on the SAC cereals list, but newer varieties will be reviewed as a market develops.

About 80% of the oats that are sold go for milling. To meet this market it is important that grain is properly dried before quality is impaired. Milling specifications are likely to include specific (or bushel) weight and screenings in addition to moisture content, but in some markets kernel content and freedom from discoloured groats are very important. There is a developing market for PGR-free oats.

Specific weight is important in the marketing of grain; it is very dependent on growing conditions. High specific weight varieties are less likely to incur discounts or risk rejection.

REDUCING DISEASE RISK

(a) The most economic way of avoiding yield loss due to disease is to grow disease resistant varieties.

Disease ratings are calculated from assessments of disease in naturally infected trials throughout the UK and in inoculated tests. Ratings are UK ratings on a 1-9 scale, where 9 indicates good resistance and 1 poor resistance. A rating is an indicator of disease risk. It describes the likely severity of infection when conditions favour disease development and compatible races of the disease are present. Where conditions are less favourable to a particular disease, or compatible races are absent, a variety may appear more resistant than indicated by its rating. Occasionally, a variety may be less resistant than expected due to the emergence of a new race of disease which overcomes its resistance.

Varieties with a rating of **8** or **9** are sufficiently resistant that the disease is unlikely to reduce yield.

Varieties with ratings of **6** or **7** are moderately resistant. Disease may develop under favourable conditions, but yield is unlikely to be substantially reduced.

Varieties with ratings of **4** or **5** are susceptible and are likely to become severely infected under conditions favourable to the disease. Fungicides will probably be required.

Varieties with ratings of **1**, **2** or **3** are very susceptible and are likely to become severely infected. Such varieties initiate epidemics. Routine fungicide treatment will be necessary.

Variety resistance can sometimes break down within season. This is most likely to happen where a variety relies on a single major gene for its resistance. If this occurs the rating may change from 9 (good resistance) to 4 or lower (susceptible).

The presence of different Rhynchosporium populations in Scotland impacts on the susceptibility of winter barley varieties in different regions. In these circumstances, varieties with good or moderate resistance can sometimes develop high levels of disease. Varieties of winter barley susceptible to mildew, yellow rust, brown rust, Rhynchosporium, net blotch or Ramularia leaf spot may act as sources of infection for spring barley crops. Fungicides applied in the spring to winter barley will reduce disease spread to spring barley. Spring barley varieties susceptible to the prevalent diseases will also need to be protected by fungicide seed treatment or sprays.

Septoria tritici is currently the most common disease of wheat. Fungicide resistance and erosions in efficacy of some azole (DMI) fungicides mean that this disease can be difficult to manage. Furthermore, varietal resistance to Septoria tritici is intermediate at best, with Alchemy, Gravitas and Tuxedo all down-rated to 6, which is now the highest rating on the SAC list. Horatio is also rated as a 6. All

other varieties on the SAC list are rated at 5. Although the difference in resistance ratings is narrow, varietal choice still allows for some control of this disease.

Septoria nodorum has declined as a significant disease of winter wheat, however it can still occur and may be overlooked as symptoms are less easy to identify than those of Septoria tritici. Beluga, Cordiale, Gallant and Solstice are the most susceptible recommended varieties to Septoria nodorum (resistance rating 5).

(b) Diversification of varieties

Principles of variety diversification:
Overall levels of certain diseases, especially barley mildew and wheat yellow rust are increased if the more susceptible varieties are grown. The risk from these diseases is reduced if more than one variety of barley or wheat is sown, provided varieties which are to be grown in adjacent fields in the same year, or in the same field in successive years, or in a mixture, are not susceptible to the same races of the pathogens.

On the basis of information supplied by the *UK Cereal Pathogen Virulence Survey* at NIAB, barley varieties have been grouped into Diversification Groups (DG) according to the races of mildew which attack them; whilst wheat varieties have been grouped according to the races of yellow rust to which they are susceptible as adult plants.

Winter wheat yellow rust:
Yellow rust is a serious threat to yield in certain varieties. The risk of spread of yellow rust is low where DG1 varieties such as Alchemy, Beluga, Horatio, Invicta, or Tuxedo, are grown together or with any one other recommended variety. The risk is high where DG2a varieties such as Cordiale, Denman, Einstein, Gallant, Grafton and Gravitas are grown with DG2b varieties such as Viscount and Solstice. Any DG2a varieties grown together presents a medium risk, whilst any DG2b grown together is very high risk. There is an especially high risk of spread where DG2b varieties are grown together with Oakley or Robigus.

Barley mildew:
Varieties in DG0 (Cassata, KWS Cassia, Pearl, Retriever, Volume and spring varieties Optic, or Forensic) do not contribute to the diversification of varieties to reduce the effect of mildew on the crop but note that DG0 varieties with high resistance ratings are effective at limiting the potential of an epidemic. Most HGCA fully recommended spring varieties in Diversification Group 1 (Belgravia, NFC Tipple, Propino, Quench, Waggon and Westminster) are currently resistant to mildew and are good partners to all varieties. The winter varieties Saffron and Sequel (DG10) should not be grown together as they carry a medium risk of mildew spread.

EYESPOT AND SHARP EYESPOT

Recent research has developed a risk assessment for eyespot; it is available at www.sac.ac.uk/crops. High risk factors include wheat as the previous crop, ploughing compared to minimal tillage, early sowing, high spring rainfall and the visually or by diagnostic assessment, does not necessarily pose a low risk.

Sharp eyespot is less common, but when infection is severe, yield loss and lodging can occur. All varieties of wheat are susceptible to some degree.

CEPHALOSPORIUM LEAF STRIPE

Cephalosporium leaf stripe can affect wheat, barley and oats, but it is most common in winter wheat. Recent HGCA research has shown varietal differences to this disease, which is most damaging to yield in continuous cereal cropping where straw is incorporated into the soil. Grafton, Gallant and Viscount demonstrate good resistance against this emerging disease threat, whilst Alchemy and Einstein are more susceptible to developing symptoms. Although no longer on the list, Consort also shows good resistance to this disease.

TAN SPOT

In 2010, Tan spot was identified in wheat crops in East Lothian. This disease is uncommon but the cold winter and mild spring in 2010 were conducive to the development of tan spot. Einstein showed most symptoms of the disease, whilst Oakley, Viscount, Robigus, Gallant and Cordiale showed few symptoms.

SNOW ROT

Snow rot has receded as an important disease of winter barley but a move to short rotations, earlier sowing and minimum cultivations would encourage it. There is insufficient evidence to give susceptibility ratings. Consideration should be given to the protection of advanced lush crops especially where the previous crop was winter barley, snow is likely to lie or where crops are weakened by manganese deficiency.

SEED-BORNE DISEASES

Loose smut is a seed-borne disease found mainly on open-flowering barley varieties (most winter and spring varieties). Certified seed will have a guaranteed low incidence of loose smut but infection can build up rapidly in home-saved seed.

Leaf stripe became common in spring barley in the early 1990's. Adoption of a voluntary standard for seed infection and the use of effective seed treatments have resulted in a significant reduction in its incidence; however, the disease remains a threat to spring barley.

Recent research has shown that Rhynchosporium and Ramularia leaf spot can be seed-borne. Rhynchosporium on the seed can lead to widespread infections on winter barley in February.

Levels of *Microdochium nivale* on seed have recently been high. There is evidence from Scotland that this fungus has developed resistance to strobilurin fungicides.

Where loose smut or leaf stripe is found in a growing crop from which seed is to be taken, the seed should be tested for these diseases at the Official Seed Testing Station for Scotland, 1 Roddinglaw Road, Edinburgh EH12 9FJ.

It is recommended that all winter wheat seed is treated to protect against *Microdochium nivale* and Bunt.

RAMULARIA LEAF SPOT

Ramularia leaf spot has been common on several varieties in the last decade causing yield loss and high screenings. Symptoms appear on the upper leaves at ear emergence; in extreme cases the top two leaves die. This damaging effect can be significantly reduced if protectant fungicides (e.g. triazoles, succinate dehydrogenase inhibitors (SDHIs), chlorothalonil) are applied at the boot stage before ear emergence. These fungicides will improve green leaf area retention, but it is common for spots to appear late in the season in some varieties. Some fungicides (e.g. mildew eradicants) may even reduce green leaf area if applied late in the season under certain circumstances. Varieties have been categorised for their resistance to leaf spots; see thumbnail sketches and the spring barley **Table**.

In recent years, Ramularia leaf spot has also developed late in the season in winter barley causing early loss of green leaf area; this problem can be minimised with the same fungicides as used on spring barley. Varieties have been categorised for their resistance to leaf spots; see thumbnail sketches and winter barley **Table**.

BARLEY MILD MOSAIC VIRUS

The virus BaMMV and the close relative BaYMV are carried by a soil-borne fungus and can cause serious losses in winter barley. BaMMV is present on a small number of farms in Aberdeenshire and East Lothian. Use of resistant varieties is the only method of preventing the disease. The varieties on the SAC list that are resistant to the common strain are Volume, Element, KWS Meridian, Retriever, Escadre, KWS Cassia, Florentine, Sequel and Cassata.

ERGOT

Ergot can affect all cereals and it is common in seasons where the flowering period is extended by cool wet weather. It is becoming common: this is serious as some users have zero-tolerance at intake. Ergot triggers a critical control point in the SQC scheme requiring counter-measures. Ergot has been reported in a

range of varieties. Maresi appears particularly vulnerable. In inoculated tests Westminster and some older or outclassed varieties such as Decanter, Oxbridge and Riviera showed symptoms. Bere barley will also be at risk. Triticale poses the highest risk, as do infertile secondary tillers. Grass-margins, grass weeds, set-aside and contaminated seed are potential sources of ergot.

ORANGE BLOSSOM MIDGE

Orange blossom midge was rare in Scotland but it has been seen in crops as far north as Tayside so growers should be alert to it in future. Viscount, Gravitas, Denman and Horatio, Robigus and Oakely have genetic resistance to this pest; see the HGCA website or Recommended List for other resistant varieties.

VARIETY RESPONSE TO DISEASE CONTROL

All trials include treated plots assessed for yield; though only a few trials have untreated plots that are assessed for yield. The untreated yield column in the variety **Tables** is expressed as the UK yield penalty where treatment is not provided. Note that there are not sufficient data to indicate untreated yields for winter oats or spring wheat.

The programmes of fungicides for barley and wheat variety trials are very comprehensive; the intention is to keep all diseases to a minimal level throughout the growing season thus allowing maximum yield potential to be achieved. For spring barley the programme consists of a two or three-spray programme depending on mildew and Rhynchosporium pressure. For winter wheat and winter barley it is a three or four-spray programme depending on disease incidence or risk. For oats it is a two or three-spray programme.

SPRING BARLEY

IBD support for distilling and brewing

ODYSSEY (Limagrain Europe)
A new provisional recommendation under test for malt distilling and brewing. It is very high yielding across all HGCA regions, with an excellent untreated yield. It is a non-producer of GN. Initial micro-malting tests indicate high hot water extract and spirit yield. Its high yield helps it achieve a relatively low grain nitrogen concentration, which is beneficial for malt distilling. It has good resistance to brackling. It has excellent resistance to mildew and very good resistance to Rhynchosporium, but is moderately susceptible to Ramularia. Its provisional rating for straw strength is moderate and maturity is the same as Concerto.

CHRONICLE (Limagrain Europe)
A new provisional recommendation under test for malt distilling and brewing. It is very high yielding in the HGCA North East region, with a very good untreated yield. It is a non-producer of GN. Initial micro-malting tests indicate a high hot water

extract and spirit yield. Like Odyssey, its low grain nitrogen is a beneficial feature. It has good resistance to brackling. Resistance to mildew and Rhynchosporium are good, whilst resistance to Ramularia is intermediate. Its provisional rating for straw strength is very good and maturity is the same as Concerto.

SHUFFLE (Syngenta Seeds Ltd.)
A provisional recommendation that has performed sufficiently well in malting tests to be granted IBD Provisional Approval 1 for malt distilling and brewing. It is a non-producer of GN. Its high yield is a clear improvement on both Optic and Concerto. Although rather tall its straw is rated as very stiff. Maturity is the same as Concerto and brackling resistance is excellent. Mildew resistance is good, whilst Rhynchosporium and Ramularia resistances are moderate. It has a bold grain with low screenings.

OVERTURE (Limagrain Europe)
A new provisional recommendation undergoing tests for malt distilling and brewing. It is high yielding, with an excellent untreated yield. It is a non-producer of GN. Initial micro-malting tests indicate very high levels of hot water extract and spirit yield. It also has above average enzyme levels, which may benefit its development into certain markets. Its grain nitrogen concentration appears to a little above that of Odyssey and Chronicle. It has good resistance to brackling. Resistance to mildew and Rhynchosporium are good, whilst resistance to Ramularia is intermediate. Its provisional rating for straw strength is moderate and maturity is the same as Concerto.

CONCERTO (Limagrain Europe)
A full recommendation with IBD Approval for malt distilling and brewing. Its market share is expected to increase significantly for harvest 2012. In some trials its grain nitrogen has been lower than Optic and screening levels are low. Its yield now looks moderate compared to newer higher yielding varieties; especially as some trials results in 2011 were disappointing. It is a GN non-producer and has produced high malt extract and spirit yield in commercial bulks. It is a relatively tall variety and matures later than average. Straw stiffness is intermediate and a little below Optic. Brackling resistance is good. Resistance to mildew is good, but it is vulnerable to Rhynchosporium and moderate for Ramularia; this gives it an average rating for green leaf area retention. Concerto is suited to early sowing and suits medium or heavier textured soils.

MOONSHINE (RAGT Seeds Ltd.)
A provisional recommendation that has produced good results in malting tests leading to its IBD Provisional Approval 1 for malt distilling and brewing. It is a non-producer of GN. It is not as high yielding as Shuffle, but has the advantage of early maturity. Straw strength is provisionally rated as moderate, rather than good. Resistance to brackling is good. Mildew resistance is very good, but it is vulnerable to Rhynchosporium and Ramularia. Initial results indicate relatively good performance on lighter textured soils.

OPTIC (Syngenta Seeds Ltd.)
Fully recommended, with IBD Approval for both brewing and malt distilling. It is classed by distillers as a low GN producer. Its share of the Scottish malting market remained high in 2011, indicating distilling industry support for a variety that has shown reliability in grain quality over several challenging seasons. Mildew resistance is poor especially at the seedling stage. It is also vulnerable to Rhynchosporium and has moderate resistance to Ramularia leaf spot. It is no longer later than average as the trend for modern varieties has been towards later maturity. Brackling or necking can be a problem in a delayed harvest and this contributes to a low rating for ear retention. Early sowing is beneficial for both yield and grain size.

IBD support for distilling only

BELGRAVIA (Limagrain Europe)
A full recommendation with IBD Full Approval for both malt and grain distilling; it is currently the only variety with IBD support for grain distilling use. It is a GN non-producer. It has excellent resistance to mildew and very good resistance to Rhynchosporium, with moderate susceptibility to Ramularia leaf spot. Its green leaf area retention is above average and there is only a small yield penalty if untreated. Its straw is tall with average strength. Trials indicate it is favoured by early sowing.

IBD support for brewing only

PROPINO (Syngenta Seeds Ltd.)
A full recommendation with IBD Full Approval for brewing. As a low GN producer it does not meet the requirements for new varieties destined for distilling use. It has a niche malting market in Scotland, with its main UK market in England. It is very high yielding, with a good untreated yield. It may be acceptable for pearling. Screening levels are low. Its good agronomic features may also attract feed growers. Apart from the rusts, disease resistance is good. It has stiff straw and good resistance to brackling. Trials indicate that it is well adapted to early sowing and medium textured soils.

QUENCH (Syngenta Seeds Ltd.)
A full recommendation on the HGCA Lists with IBD Approval for brewing, though it should be regarded as being outclassed by Propino for use in Scotland. It does not qualify for distilling support as it fails to meet the requirement for limiting GN. It had just over a 10% share of the English brewing market in 2011. Its straw is short and stiff with good resistance to brackling and ear loss. Rhynchosporium resistance is above average, but it is potentially vulnerable to both yellow and brown rust. Maturity is similar to Optic. It appears better adapted to high yielding sites and early sowing.

Feed varieties

WAGGON (Syngenta Seeds Ltd.)
A fully recommended very high yielding feed variety. Although not as tall as some older feed varieties it is the most popular choice for this market and performs well in most feed areas. Samples may also be acceptable for pearling. It is very susceptible to Rhynchosporium, especially in the West of Scotland where its infection levels have been worse than Optic. In the East its infection levels have been lower and it has appeared to be more resistant. Its straw is of average length and stiff with a good rating for brackling resistance. Apart from Rhynchosporium, disease resistance is good and so is its green leaf area retention. It is the earliest maturing variety on the HGCA spring barley list and maintains its yield over a range of soil fertility situations and sowing dates.

WESTMINSTER (Limagrain Europe)
A fully recommended variety. It no longer has IBD Approval for brewing and its English brewing purchases have declined since a modest peak 2007 and 2008. Its main use in Scotland is as a tall feed variety. It has good disease resistance to both mildew and Rhynchosporium, with a relatively small response to fungicide and good green leaf area retention. These resistances may contribute to its late maturity. It has potential for whole-crop use and may be bought for pearling. It maintains its yield over a range of conditions with relatively good performance at lower potential sites.

WINTER BARLEY

IBD Approval for brewing

CASSATA (Limagrain Europe)
A full recommendation as a specialist brewing variety, with full IBD Approval. It is one of only two malting winter barleys sourced in Scotland. It provides an alternative to Pearl with advantages in stiffer straw, lower risk of dormancy and resistance to BaMMV. Compared with Pearl, it is weaker for mildew, net blotch and Ramularia leaf spot; it is also very vulnerable to yellow rust. RL data suggests it is relatively stable across soil types, but performs relatively better on higher yielding sites.

PEARL (Limagrain Europe)
A full recommendation with IBD Full Approval for brewing. It was the dominant malting winter barley for ten years, though the 2011 English intake was led by Cassata. Pearl remains important for the malting interest in south-east Scotland. Dormancy can limit its use in some seasons. Although it is very tall for a two-row variety it has shown less lodging than expected. It is relatively late to mature and is susceptible to winter-kill. It is susceptible to mildew at the seedling stage but has better adult plant resistance. Its resistance to Ramularia leaf spot tends to be good and green leaf area retention is well above average. It is moderately susceptible to Rhynchosporium and tends to be weak for net blotch. It is sometimes used

in blends to improve the specific weight of some of the six-row varieties. It suits heavier soil types and is more likely to out-yield Cassata on the less fertile sites.

Two-row feed varieties

RETRIEVER (Sejet, Denmark/Limagrain UK)
This full recommendation has produced outstanding yields that are close to the six-row varieties. In some trials its early plant growth has looked disappointing but it still produced excellent yields. Specific weight is rather low and screening levels are high compared with other recommended two-row varieties. It may have some potential for pearling provided the colour isn't too yellow. Although short its moderate strength straw merits a robust PGR programme. A high yield loss if untreated reflects vulnerability to mildew, net blotch and Ramularia leaf spot. It has poor green leaf area retention indicating a need for sound protection. It has BaMMV resistance and above average resistance to yellow rust. In some Scottish trials its vulnerability to Rhynchosporium is more than would be expected by its UK resistance rating. Yield performance is relatively good when sown on lighter textured soils.

KWS CASSIA (KWS UK Ltd.)
A full recommendation, with a high yield and excellent specific weight. It shares many of Saffron's features, but with a 7% higher yield. Like Saffron, it is very vulnerable to Rhynchosporium but it has slightly better resistance to mildew and Ramularia leaf spot. It is resistant to BaMMV. It is also short, with slightly weaker straw than Saffron. It is well suited to light textured soils and yields relatively better on high fertility sites.

FLORENTINE (Senova)
A provisional recommendation. Its North region yield is just below that of KWS Cassia. It has a good specific weight with low screenings. Very stiff straw and maturity that is earlier than Saffron and KWS Cassia are useful features. It has no significant disease weaknesses, but can show moderate levels of Mildew and Ramularia leaf spot. It is resistant to BaMMV. Trial results indicate that yields are relatively good on high yielding sites, with consistency across different soil textures.

SAFFRON (KWS UK Ltd.)
This fully recommended two-row feed variety has become outclassed for yield compared to newer feed varieties. However, it retains some interest as a short stiff variety with an excellent specific weight. It has good resistance to net blotch but is very weak for mildew and Rhynchosporium giving it a large response to fungicide. It has moderate resistance to Ramularia leaf spot. It is rather late. It is more suited to heavier soil and sites with high yield potential, especially after a break crop.

Six-row feed varieties

VOLUME (Syngenta Seeds Ltd.)
A full recommendation. This hybrid six-row has a very high yield and an encouraging specific weight, though screenings are relatively high. It is tall with a modest rating for lodging resistance. A robust growth regulator programme is advisable to protect its high yield potential. It has no significant disease weaknesses and green leaf area retention is relatively good. Resistance to Ramularia leaf spot is above average. It has resistance to BaMMV. Like other hybrids, it is better adapted to lighter textured soils and suits a range of sowing dates.

ELEMENT (Syngenta Seeds Ltd.)
A provisional recommendation. This hybrid six-row has a very high yield. Its specific weight is similar to Volume's, but it has much lower screenings. It is a little taller than Volume and carries the same caution about protecting a weak straw when yield potential is high. It is the earliest maturing winter barley. It has relatively good resistance against yellow rust, but is weak for brown rust; otherwise it has moderate disease resistance. It is resistant to BaMMV. It performs very well on lighter textured soil and suits a range of sowing dates.

KWS Meridian (KWS UK Ltd.)
This new provisional recommendation is a non-hybrid variety with a yield close to Volume and Element. Its specific weight is rather low, though screenings are low. It has excellent resistance to mildew and net blotch, with moderate resistance to Rhynchosporium and Ramularia leaf spot. It resistances to rusts is also good. It is the tallest winter barley on the recommended lists, but its straw is relatively stiff for a six-row. It has average maturity and initial data suggests it yields well across all soil types.

ESCADRE (KWS UK Ltd.)
A provisional recommendation. This non-hybrid variety has a clear yield improvement over Sequel. It has a very good specific weight and low screenings. It is not as tall as other the other six-rows, though straw strength is intermediate and similar to other varieties. It is relatively weak against mildew, and brown rust, but has good resistance to Rhynchosporium and net blotch, with above average resistance to Ramularia leaf spot. Trials data indicate it is well suited to lighter soils, but less so to soils with heavier texture.

SEQUEL (Syngenta Seeds Ltd.)
This fully recommended six-row variety retains its place because of a high specific weight, though screening losses are also rather high. Its North region yield is holding up better than its UK average. Bold samples may be accepted for pearling. It has tall rather weak straw, but is early maturing and resistant to BaMMV. Resistances to mildew and brown rust are relatively weak, whilst Ramularia leaf spot resistance is only moderate. Its yield on heavy soils can be disappointing, but otherwise it is fairly stable across sowing date, crop rotation and site yield potential.

WINTER WHEAT

Soft textured varieties preferred by the distilling industry

GRAVITAS (Limagrain Europe)
A provisional recommendation in nabim Group 4, with a medium rating for distilling. It is provisionally listed for export as a ***uks*** variety. Its specific weight is intermediate and Hagberg falling number relatively good for this Group. Its yield is at the Viscount level. Straw strength is weak, but response to PGR is very good. Its disease resistance profile is better than average including intermediate resistance to Septoria tritici. Its yellow rust resistance tends to be good. It has resistance to orange blossom midge. Maturity is later than Viscount, but earlier than Alchemy. It yields relatively better as a first cereal and on heavier soils.

VISCOUNT (KWS UK Ltd.)
This full recommendation is rated good for distilling. As a nabim Group 4 variety, it is unlikely to be used for biscuit-making in Scotland as it lacks dough extensibility. It is provisionally listed for export as a ***uks*** variety but may struggle to meet the specification. Specific weight is intermediate and Hagberg falling number is relatively low. Care may be needed in a wet harvest as it has a relatively low resistance to sprouting. Viscount is very vulnerable to yellow rust with a resistance rating of 4, this is likely to increase the response to fungicide. It is resistant to orange blossom midge. Straw stiffness is relatively good and similar to Alchemy or Robigus. Trials data indicate that it performs relatively consistently across sowing dates, soil types and rotational position.

HORATIO (Limagrain Europe)
This new provisional recommendation is rated medium for distilling. Its grain yield matches the current market leaders. As a nabim Group 4 variety it is unlikely to be used for biscuit making. It is provisionally listed for export as an ***uks*** variety that may be suitable for blending into export cargoes. At present it does not have a rating for sprouting resistance, though its relatively good Hagberg falling number suggests it is less susceptible to sprouting than Viscount or Beluga. There are no significant disease weaknesses, with ratings for mildew, yellow rust and Septoria tritici being relatively good; the exception is eyespot, which tends to be weak. It has moderate straw strength, but with a good response to PGRs. It yields relatively better as a first cereal and limited results suggests it performs well when sown early.

DENMAN (Syngenta Seeds Ltd.)
A new provisional recommendation in nabim Group 4 with a good rating for distilling. It is provisionally listed for export as a ***uks*** variety suitable for blending. Its specific weight is fairly low, but Hagberg falling number is above average for this Group. Its yield is similar to Viscount's. Like Gravitas, its straw strength is weak, but it has a good response to PGRs. This variety is relatively early maturing. Its disease resistances for yellow rust and Septoria nodorum tend to be good, whilst those for mildew, Septoria tritici, brown rust and eyespot tend to be poor. It has resistance to orange blossom midge. It yields relatively better a first cereal.

BELUGA (Senova)
This provisional recommendation is rated good for distilling. As a nabim Group 4 variety it is unlikely to be used for biscuit-making. It is provisionally listed for export as a ***uks*** variety but will be limited by its very low Hagberg falling number, which adds to concern about its sprouting risk in a wet harvest. Its resistance to yellow rust is very good, making it a very useful partner alongside more susceptible varieties. Eyespot resistance is above average. Its relatively high yield loss when untreated with fungicide is mainly due to mildew, Septoria tritici and very low resistance to brown rust. Its straw is short and very stiff. There are indications that it has done relatively better on heavier soils probably helped by its very stiff straw. It also yields well as a second cereal.

ALCHEMY (Limagrain Europe)
A full recommendation, rated medium for distilling. Placed in nabim Group 4, it is unlikely to be used for biscuit-making in Scotland, but it has potential for export as a ***uks*** blending variety: it does not suit some export buyers as a pure variety. By soft wheat standards it is high for both specific weight and Hagberg falling number and its sprouting resistance is above average, better than Viscount and Beluga. Its yield loss when untreated is still relatively low, which reflects above average resistance to the normal foliar disease threats in Scotland, though brown rust is a weakness. Its excellent resistance to yellow rust makes it a useful partner to all other varieties. Straw strength is average and maturity is later than average. A slow speed of development means that it does not suit late sowing. It performs relatively better if sown after a break crop and at high yielding sites.

ISTABRAQ (Limagrain Europe)
This variety is no longer on the HGCA recommended list. It has not been in yielded trials for two years and has become outclassed by newer varieties. However, some interest remains as it is rated good for distilling. It also yields relatively well when grown as a second cereal and has been a useful option for late sowing. Specific weight was consistently good with Hagberg falling number about average for this category. Its tall and rather weak straw responds well to PGR. Disease weaknesses were mildew and Septoria tritici. Maturity is relatively late.

Soft textured varieties for distilling and with biscuit making quality

INVICTA (Limagrain Europe)
This full recommendation is in nabim Group 3 and is suitable for biscuit-making, with a medium rating for distilling. It has provisional support as a ***uks*** blending variety for export, but note the specific weight is rather low. It is weak against mildew and eyespot, though its yellow rust rating is good. Straw strength is similar to Robigus. It is later to mature than most other recommendations in Group 3. It underperforms as a second cereal and intermediate sowing dates are preferable. Limited data indicates a good response to heavier, high yielding, soils.

TUXEDO (RAGT Seeds Ltd.)
A provisional recommendation in nabim Group 3. It has potential for biscuit making and a medium rating for distilling. It has provisional support as a ***uks*** blending variety for export but its specific weight is rather low, though its Hagberg falling number is well above the average for this Group. Yield and maturity are similar to Robigus and straw stiffness is above average, with a good response to PGR. Its disease resistances are an improvement on Robigus, with good resistance to yellow rust and Septoria nodorum, and above average resistance to mildew. Its yield holds up relatively well as a second cereal.

ROBIGUS (KWS UK Ltd.)
This variety is not on the HGCA recommended list as it is no longer in yielded trials and has become outclassed by newer varieties. Some Scottish interest remains because of its biscuit-making qualities and a medium rating for distilling. It was also listed as a ***uks*** variety for export. Note that its resistance to sprouting tends to be weak. A strong feature remains its high yield in first wheat situations, but yield is severely affected when following another cereal in the rotation. Straw strength is average with a rather disappointing response to PGR. It is extremely vulnerable to yellow rust, with other disease resistances about average. It does not suit early sowing because of a fast speed of development and a relatively low vernalisation requirement.

Other recommended varieties

EINSTEIN (Limagrain Europe)
This fully recommended hard endosperm variety is a standard nabim Group 2 for bread-making. Although at the lower end of Group 2 quality, it has been widely accepted by millers; it also has export use as a ***ukp*** variety. However, its current market size and seed availability mean that this variety is now becoming outclassed. Specific weight and Hagberg are moderately high but not as high as Cordiale. Resistance to sprouting is relatively good. Its lodging rating is intermediate, which includes above average risk to root lodging. It responds well to PGR, especially when applied early. It has moderate all round disease resistance with Septoria tritici and tan spot resistance tending to the weak. It is only moderate for yellow rust. Its fast speed of development makes it better suited to later sowing. It does relatively well as a second cereal with a bias in favour of lighter soils and lower yield potential sites.

GALLANT (Syngenta Seeds Ltd.)
This fully recommended bread-making variety is in nabim Group 1 and along with Solstice is a preferred millers choice. It retains a specific use recommendation in Scotland. It is listed as a ***ukp*** variety with a very good Hagberg falling number, moderately high specific weight and good Chopin alveograph figures. Its North region yield is slightly down on its UK average, but good protein levels suggest it has good nitrogen scavenging ability. It has rather low ratings for foliar disease and is vulnerable to yellow rust with a rating of 5, though it shows good resistance to Cephalosporium leaf stripe. Straw strength is average and it is early maturing. A fast speed of development and vulnerability to ear sterility mean that early

sowing should be avoided, as should sites prone to spring frosts. It yields well on heavier soils.

CORDIALE (KWS UK Ltd.)
This fully recommended bread-making variety is the preferred nabim Group 2 variety by millers. It is classified as a specific use variety in Scotland because of its market size and vulnerability to ear sterility. It is listed as a ***ukp*** variety for export with good Chopin alveograph figures. Both specific weight and Hagberg are very high. It justifies a robust fungicide programme with vulnerability to both Septoria diseases and brown rust. It shows good resistance against Cephalosporium leaf stripe. It is early maturing with stiff straw and provides a useful choice as a second cereal, and suits heavier soils. It has below average resistance to ear sterility and as a relatively fast developer and should not be sown too early.

SOLSTICE (Limagrain Europe)
This fully recommended variety in nabim Group 1 is a preferred millers choice for bread-making. It has a specific use recommendation in Scotland. It is ***ukp*** listed and can be sold into export markets. Specific weight and Hagberg falling number are moderately high but not as high as Cordiale. It has weak resistance to all the main foliar diseases, especially yellow rust, mildew and eyespot. It has stiff straw and above average resistance to sprouting. Vulnerability to eyespot limits its use for early sowing. It performs well as a second cereal and its stiff straw is suited to heavier textured soils.

OAKLEY (KWS UK Ltd.)
This variety is no longer on the HGCA recommended list. It is extremely vulnerable to yellow rust and is no longer in yielded trials. Although high yielding, it is now categorised as outclassed in Scotland. As a hard endosperm nabim Group 4 wheat, there is little prospect of use for distilling or milling. It has a low specific weight and Hagberg falling number. It carries a low resistance rating for eyespot and is also weak for mildew Fusarium ear blight. It has resistance to wheat orange blossom midge. It is a relatively slow developer, though average straw strength and susceptibility to eyespot limit its suitability for early sowing. It has yielded relatively well on high potential sites where it benefits from robust disease and lodging protection.

GRAFTON (KWS UK Ltd.)
A fully recommended variety. As a hard endosperm in nabim Group 4 there is little prospect of use for distilling or milling, but it has several strengths that make it worth considering as feed wheat. Compared with Oakley, it has a very high specific weight and Hagberg falling number. It is also has early maturity and is exceptionally stiff, with very good eyespot and yellow rust resistance. Fusarium ear blight and brown rust resistances are rated poor. It yields well on heavy sites where its good lodging resistance is an advantage. It is well suited to early sowing because of its slow speed of development, very stiff straw and good eyespot resistance. It shows good resistance to Cephalosporium leaf stripe and competes well against most other varieties when grown as a second cereal. Its yield holds up well in the wetter West.

Winter varieties require vernalisation (some cold weather); this requirement limits their use for spring sowing. The latest safe sowing date in Scotland is likely to be at the end of February with varieties such as Gravitas, Denman, Invicta and Tuxedo at the safer end of the spectrum.

SPRING WHEAT

Spring varieties develop without the need for vernalisation. High yielding varieties compete well with winter milling wheats when sown in late autumn. They can be also sown later in the spring, but this leads to a later harvest. Spring wheat is trialled on fewer sites than its winter counterpart and the variety **Table** lists UK data only. Milling quality features are important as failure to meet specifications for protein and specific weight is a common cause of rejection.

TYBALT (Wiersum BV, Netherlands / Limagrain UK)
A fully recommended nabim Group 2 variety. As a very high yielding variety protein levels can become diluted, typically 1.0% below Paragon. Additional nitrogen may be required to meet protein specifications. Hagberg falling number tends to be good, but specific weight is low. It has a low rating for straw strength, principally based on weakness when autumn sown. Resistance to sprouting tends to be good.

ASHBY (KWS UK Ltd.)
A fully recommended nabim Group 2 variety. Its spring-sown yield is much lower than Tybalt's, though its protein level and specific weight are much better. Hagberg falling number tends to be good. It is slightly weaker for mildew and Septoia tritici than other spring varieties. It has a relatively stiff straw and is later maturing than Paragon.

PARAGON (RAGT Seeds Ltd.)
The only fully recommended nabim Group 1 spring variety and the millers' preference. As a late autumn sown variety it is 5% lower yielding than Solstice, but with better protein. When spring-sown, its yield is 11% below Tybalt. It has no significant agronomic weaknesses.

MULIKA (Blackman Agriculture/Senova Ltd.)
A provisional recommendation in nabim Group 1. It is higher yielding than Paragon, with a good protein level, Hagberg falling number and specific weight. It has no significant agronomic weaknesses and its provisional rating for sprouting resistance is good.

SPRING OATS

Generally, all recommended oat varieties are acceptable to millers, but growers should check for local preferences and quality requirements. The yields given in the variety **Table** are UK yields.

CANYON (Nordsaat, Germany/Saaten Union UK Ltd.)
A provisional recommendation. Its yield average is very good, but with some seasonal variation. It has moderate kernel content and specific weight. Although very tall, its lodging resistance is good. It also has the best mildew resistance in spring oats. As with all new varieties it can take time for a market position to develop.

HUSKY (Nordsaat, Germany/Saaten Union UK Ltd.)
Fully recommended by the HGCA. Although it is supported by some millers, growers should check with their local buyer to ensure it has a market. A relatively small market share and seed area, compared to Firth and Atego, means this variety is categorised as becoming outclassed in Scotland. Its yield average is just above Firth's. It is also above Firth in specific weight, but below for kernel content. Provisionally its bold grains and mill yield are positive features but de-hulling may present challenges. Early maturity and stiff straw with good mildew are strong features, but in some areas vulnerability to crown rust will be important.

ATEGO (Selgen, Czech Republic/Saturn Seeds; Trevor Cope Seeds Ltd.)
A full recommendation. Although kernel content and specific weight are relatively low, the variety mills well with a good hull to kernel ratio and good de-hulling. It is very weak for mildew and has moderate straw strength, but is early maturing.

FIRTH (KWS Lochow, Germany/KWS UK Ltd.)
A fully recommended variety well known for its reliability in agronomic characters and grain quality. For millers it has a combination of good kernel content, low screenings and moderate specific weight; they also value its reliability and speed through the mill. It has maintained a dominant position in seed area. Its resistance to mildew tends to be good. In some season's it can show a tendency to free-shell; reducing the drum speed should alleviate this problem.

WINTER OATS

Winter oats are widely grown. Earliness and yield relative to spring oats are major benefits. There is a substantial milling market for winter oats in Scotland: some of this must be PGR-free. Achieving PGR-free winter oats is likely to be more challenging than achieving PGR-free spring oats. As winter oats are less hardy than winter wheat and winter barley, they should be sown early to reduce the risk of winter-kill and plant heave. The yields given in the variety **Table** are UK yields.

BALADO (IBERS, Aberystwyth/Senova Ltd.)
This full recommendation is a semi-dwarf, with a yield 9% above Gerald. It has attracted milling interest despite low kernel content. As a semi-dwarf it has a top-rating for stiffness which will appeal to millers requiring PGR-free oats. However, it is weak for both mildew and crown rust giving it a high response to fungicide. Maturity is later than average.

DALGUISE (Senova Ltd.)
This full recommendation retains some strong milling support in south Scotland with good colour, size and specific weight. However, it can be considered as becoming outclassed compared to Balado's yield and Gerald's wider market appeal. Scottish yields have been variable. It is very tall and has weak straw. On some sites lodging has reached high levels, indicating a high risk if PGR is omitted. It is early ripening and together with its long straw is valued by growers not aiming for the PGR-free market. Crown rust and mildew resistance are very weak.

GERALD (IBERS, Aberystwyth/Senova Ltd.)
A fully recommend variety. Popular with growers and acceptable to millers, despite a low kernel content. It maintains its yield rather better in Scotland than Dalguise, especially in the absence of PGR, though its straw strength is only a little better than Dalguise. Resistances to mildew and crown rust are weak.

MASCANI (IBERS, Aberystwyth/Senova Ltd.)
A full recommendation for its very high milling potential, based on excellent kernel content, high specific weight and low screenings. It is also relatively free of discoloration. Although its yield average is similar to Gerald, its performance has been disappointing in some Scottish trials. It has moderate resistance to mildew. Good resistance to crown rust, may be offset by a new race, though so far infection levels have been low.

NAKED OATS

Naked oats yield below 80% of the conventional varieties, but they have the potential to earn a premium and should be grown on contract. The terms of the contract have an important bearing on the profitability of the crop. Naked oats should be regarded with some caution as they must not be harvested before fully mature and particular care is needed in drying and handling this crop. Information on naked varieties may be obtained from the HGCA website. There is a market for naked oats in the poultry industry.

SPECIAL RECOMMENDATIONS FOR THE WEST

A few varieties perform rather better or worse in the wetter conditions of the west than in the drier east, these are highlighted in this section:

Spring barley:
Riviera retains some interest in SW Scotland; Westminster also yields well and looks useful for whole-crop. Waggon is early and has produced excellent yields with stiff straw, but there is a severe risk of Rhynchosporium infection if unprotected. Propino with its high yield and good agronomic features is a useful feed option.

Winter barley:
The limited yield data doesn't show much differentiation for the West. In general stiffer varieties should be preferred.

Winter wheat:
For ***soft wheat***, Beluga, Gravitas, Denman and Alchemy, Beluga, Invicta and Tuxedo have yielded well in the West, though both Alchemy and Invicta can be late to mature, and lodging resistance in Gravitas and Denman is low when untreated. The stiffest and earliest variety is Beluga. Istabraq also performed well when it was in recommended list trials. Robigus is penalised as it is disappointing as a second cereal. Istabraq is better as second cereal, but watch its vulnerability to lodging and mildew. On present evidence, Viscount underperforms in the West.

For ***hard wheat***, the milling varieties Solstice and Gallant yield well in the West, though Gallant is not as stiff. Grafton is the best feed option as it has very stiff straw, excellent eyespot resistance and is early. For ***whole-crop***, Grafton looks very useful: Alchemy also looks suitable.

SAC is grateful to the HGCA and BSPB for funding cereal variety testing.
The HGCA Recommended Lists are managed by members of the HGCA Research and Knowledge Transfer Team. The full data collected and the HGCA Recommended Lists are available on the HGCA website (www.hgca.com)

SAC is grateful to the members of the Scottish Variety Consultative Committee (Cereals) for their advice and other input concerning use of varieties that make up this recommended list.

For further information consult your local SAC Farm Rural Business Services Office or the Crop & Soil Systems Research Group or Crop Clinic, West Mains Road, Edinburgh EH9 3JG.

SAC Recommended List for Cereals 2012

Spring barley (Yield of 100 = 7.2 t/ha)

Year First Listed	Recommendation		Grain yield % treated Control	Yield loss (%) if un-treated	Use B=brewing, D=distilling, GD=grain distilling	IBD Malting Approval†	Screenings <2.5 mm	Specific weight kg/hl	Resistance to ear loss 1-9	Maturity days +/ - Optic	Straw strength 1 to 9 weak-strong	Straw length cm	Brackling risk 1 to 9 high-low	Disease resistance 1 susceptible to 9 resistant		
														Mildew	Rhyncho-sporium	Ramularia
2012	P1	Odyssey	108	12	B & D	T	[3.7]	67.8	[7]	+1	[6]	73	8	9	7	(5)
2012	P1	Chronicle	107	12	B & D	T	[3.8]	67.5	[7]	+1	[8]	74	8	8	7	(6)
2005	R	Waggon	106	12	Feed	No	-	67.4	7	-1	8	73	8	9	3	(7)
2010	R	Propino	105	11	B	F	2.7	66.9	7	0	8	76	8	8	7	(7)
2011	P2	Shuffle	105	12	B & D	P(1)	2.9	66.9	6	+1	[9]	77	8	9	6	(6)
2012	P1	Overture	104	8	B & D	T	[3.4]	67.7	[7]	+1	[6]	75	8	8	7	(6)
2007	O	Quench	104	12	B	F	4.5	67.6	8	+1	8	71	8	9	8	(5)
2009	R	Concerto	101	12	B & D	F	2.8	68.1	7	+1	6	78	8	8	4	(6)
2011	P2	Moonshine	101	12	B & D	P(1)	3.1	67.1	6	0	[6]	71	8	8	4	(5)
2008	R	Belgravia	100	9	D & GD	F	3.7	68.2	7	+1	7	76	8	9	8	(6)
2005	R	Westminster	99	9	Feed	No	3.0	70.0	7	+2	6	82	7	9	8	(6)
1995	R	Optic	96	16	B & D	F	4.7	69.7	6	0	8	75	4	5	4	(6)

Winter barley (Yield of100 = 8.5 t/ha)

Year First Listed	Recommendation		Grain yield % treated Control	Yield loss if un-treated %	Suitability to lighter soils	IBD Malting Approval†	Screenings <2.5 mm	Specific weight kg/hl	Resistance to ear loss 1-9	Maturity days +/- Pearl	Straw strength 1 to 9 weak-strong	Straw length cm	Disease resistance 1 susceptible to 9 resistant				
													Mildew	Rhyncho-sporium	Net Blotch	Ramularia	BaMMV R=resistant
2009	R	Volume	116	18	Good	No	12.7	68.4	7	-2	6	98	6	8	6	(7)	R
2011	P2	Element	115	21	Good	No	4.5	67.9	6	-3	6	101	6	6	7	(6)	R
2012	P1	KWS Meridian	114	19	Good	No	5.0	65.6	7	-2	7	102	9	6	[8]	(6)	R
2007	R	Retriever	111	23	Good	No	-	66.8	8	-1	7	81	6	6	5	-	R
2011	P2	Escadre	108	18	Good	No	6.6	69.6	7	-2	6	95	5	8	8	(7)	R
2010	R	KWS Cassia	107	17	Good	No	3.6	70.5	7	-1	7	85	5	4	7	(7)	R
2011	P2	Florentine	105	19	Moderate	No	5.2	68.1	8	-2	8	85	6	7	7	(6)	R
2003	R	Sequel	105	19	Moderate	No	10.9	69.2	7	-2	6	98	5	8	6	(6)	R
2005	O	Saffron	100	18	Moderate	No	4.5	70.1	8	0	8	85	3	4	8	(6)	
2007	S	Cassata	98	17	Moderate	F	3.3	68.1	7	0	8	85	4	8	4	(5)	R
1999	R	Pearl	95	15	Moderate	F	3.3	70.2	7	0	7	94	6	6	5	(7)	

Colour code | Good | Tends to be good | Intermediate | Tends to be poor | Poor |

R = Recommended for general use	S = Specific use variety	F = IBD Full Approval	- = Insufficient information
P1 and P2 = Provisional year of recommendation	† Institute of Brewing and Distilling	P(1) or P(2) = IBD Provisional Approval Stage 1 or 2	[ ] = HGCA limited data
O = Becoming outclassed		T = Under test as a malting variety	( ) = SAC score

The full data collected and the HGCA Recommended Lists are available on the HGCA website (www.hgca.com)

SAC Recommended List for Cereals 2012

Winter wheat (Yield of 100 = 10.3 t/ha)

Year First Listed	Recommendation		Grain yield % treated Control	Yield loss if untreated %	Use as a 2nd cereal	Quality markets			Specific weight kg/hl	Hagberg falling number	Maturity days +/- Sol-stice	Straw strength 1-9	Straw length cm	Resist-ance to sprouting 1-9	Disease resistance 1 susceptible to 9 resistant				
						Distilling	Biscuit and uks = ‡	Bread and uks = ‡							Mildew	Yellow rust	Septoria nodorum	Septoria tritici	Eyespot
2011	P2	Gravitas	104	14	Mod	Medium	Poor ‡	Poor	77.0	214	+2	5	90	-	7	7	6	6	6
2009	R	Viscount	104	13	Good	Good	Poor ‡	Poor	76.1	172	+1	7	83	4	7	4	7	5	6
2012	P1	Horatio	[104]	13	-	Medium	Poor ‡	Poor	76.4	238	+1	6	89	-	7	8	[6]	6	5
2011	P2	Denman	104	14	Poor	Good	Poor	Poor	75.9	212	0	5	83	-	5	7	7	5	5
2010	R	Beluga	103	19	Good	Good	Poor ‡	Poor	75.7	159	0	9	80	4	4	9	5	5	7
2006	R	Alchemy	100	13	Poor	Medium	Poor ‡	Poor	77.5	246	+3	7	93	6	7	8	6	6	6
2011	P2	Tuxedo	102	13	Mod	Medium	Good ‡	Poor	75.4	283	+2	8	84	-	7	9	8	6	6
2010	R	Invicta	102	14	Poor	Medium	Good ‡	Poor	75.7	243	+3	7	91	6	4	8	6	5	4
2003	O	Einstein	99	13	Good	Poor	Poor	Med ‡	77.8	278	-1	6	86	6	6	6	6	5	5
2009	S	Gallant	97	16	Mod	Poor	Poor	Good ‡	77.9	307	-2	7	84	6	5	5	5	5	5
2004	S	Cordiale	97	15	Good	Poor	Poor	Med ‡	79.5	318	-2	7	80	6	6	7	5	5	4
2002	S	Solstice	96	18	Good	Poor	Poor	Good ‡	78.0	266	0	8	93	7	4	4	5	5	4
2009	R	Grafton	102	11	Good	Poor	Poor	Poor	78.8	287	-2	9	77	5	7	8	5	5	8

Varieties no longer on the HGCA Recommended List

2007	O	Oakley	108	29	Mod	Poor	Poor	Poor	76.2	161	+1	7	86	5	6	1	7	5	3
2004	O	Istabraq	Refer to thumbnail sketches		Good	Good	Poor	Poor	Refer to thumbnail sketches for agronomic information										
2003	O	Robigus			Poor	Medium	Good ‡	Poor											

Colour code | Good | Tends to be good | Intermediate | Tends to be poor | Poor |

R = Recommended for general use	O = Becoming outclassed	‡ = See thumbnail sketch for export potential	- = Insufficient information to publish a rating
P1 and P2 = Provisional year of recommendation	S = Specific use variety	Mod = moderate; Med = medium	[ ] = HGCA limited data

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SAC Recommended List for Cereals 2012

Spring oats (Yield of 100 = 7.6 t/ha)

Year first listed	Recommendation		UK Grain yield % treated controls	Yield loss if un-treated %	% Kernel content	Screenings %<2.0mm	Specific weight kg/hl	Maturity days +/- Firth	Straw strength 1-9 weak-strong	Straw length cm	Crown Rust 1-9	Mildew 1-9
2011	P2	Canyon	105	11	75.8	[0.1]	53.7	-3	8	112	-	8
2008	O	Husky	99	14	77.5	0.1	54.0	-4	8	105	4	7
2007	R	Atego	98	20	75.3	0.2	52.1	-3	6	100	6	3
2000	R	Firth	98	13	78.3	0.1	53.0	0	6	102	5	7

Winter oats (Yield of 100 = 8.2 t/ha)

Year first listed	Recommendation		UK Grain yield % treated controls	Yield loss if un-treated %	% Kernel content	Screenings %<2.0mm	Specific weight kg/hl	Maturity days +/- Gerald	Straw strength 1-9 weak-strong	Straw length cm	Crown Rust 1-9	Mildew 1-9
2010	R	Balado	106	-	73.7	-	50.0	+2	9	87	-	4
2003	O	Dalguise	101	-	76.0	-	53.9	-2	4	116	-	4
1993	R	Gerald	101	-	73.2	-	52.5	0	6	114	-	3
2004	R	Mascani	98	-	78.3	-	53.6	-1	6	112	-	6

Spring wheat (Yield of 100 = 6.9 t/ha)

Year first listed	Recommendation		UK Grain yield % treated controls	Yield loss if un-treated %	nabim Group	Hagberg falling number	Specific weight kg/hl	Maturity days +/- Paragon †	Straw strength 1-9 weak-strong	Straw length cm	Septoria tritici	Mildew
2003	R	Tybalt	106	-	2	280	75.6	+1	[3]	77	6	8
2003	R	Ashby	99	-	2	282	78.1	+2	7	80	5	6
1999	R	Paragon	95	-	1	273	77.7	0	6	86	6	8
2011	P2	Mulika	[103]	-	1	294	77.1	-	-	80	6	[7]

Colour code | Good | Tends to be good | Intermediate | Tends to be poor | Poor |

R = Recommended for general use	O = Becoming outclassed	[ ] = HGCA limited data
P1 and P2 = Provisional year of recommendation	- = Insufficient information to publish a rating	

The full data collected and the HGCA Recommended Lists are available on the HGCA website (www.hgca.com)